Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (currently amended) A method of increasing the sharpness of a source image based on at least one auxiliary, co-registered image(s) of a higher degree of sharpness, wherein the source and auxiliary images comprise a plurality of pixels with corresponding spectral intensities, and wherein the spectral intensities of co-located pixels in the source and one or more auxiliary images define an intensity vector for each co-located pixel, comprising:

resampling the source and the auxiliary images to a common, lower resolution;

determining for each source image pixel a gain relating a differential change in intensity in the source image pixel with a differential change in intensity of a corresponding auxiliary image pixel, based on the common, lower resolution, wherein determining the gain includes dividing the pixels in the source image and auxiliary image into corresponding pixel groups each having a plurality of pixels, calculating an average value for each pixel group in the source image and for each corresponding pixel group in the auxiliary image, subtracting the average value from each pixel group to create pixel difference groups, and computing the gain between corresponding pixels of each pixel difference group of the source image and the corresponding pixel difference group of the auxiliary image;

deriving a mapping function correlating determined gains with corresponding intensity vectors;

subdividing each pixel of the original source image into a plurality of small pixels, each small pixel of the original source image corresponding in size and location to a small pixel in the auxiliary image; and

modifying the intensity of each subdivided source pixel based on differences in intensities between the small and large pixels in the auxiliary image and an interpolated gain from the mapping function.

2. (original) The method of claim 1, wherein each of the large source pixels is subdivided into N x M pixels in the subdividing step.

3. (original) The method according to claim 2, wherein N is equal to M.

4. (original) The method according to claim 2, wherein N is not equal to M.

5. (original) The method according to claim 1, wherein the intensity vector includes at least two spectral intensities for each pixel.

6. (original) The method according to claim 1, wherein the deriving step includes creating a codebook relating intensity vectors to at least one corresponding gain value based on the determining step.

7. (original) The method according to claim 6, wherein the creating is performed according to vector quantization.

8. (original) The method according to claim 6, wherein the modifying is performed according to a weighted average of the gain value for each intensity vector in the codebook.

9. (original) The method according to claim 6, wherein the modifying is performed using a general regression neural network having node centers based on the intensity vectors in the codebook.

10. (original) The method according to claim 6, wherein the modifying is performed using a probabilistic neural network having node centers based on the intensity vectors in the codebook.

11. (original) The method according to claim 1, wherein the determining, deriving, subdividing and modifying steps are performed based on a plurality of co-located auxiliary images.

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12. (new) The method according to claim 1, wherein each pixel group comprises N x N pixels.

13. (new) The method according to claim 12, wherein N is 2.